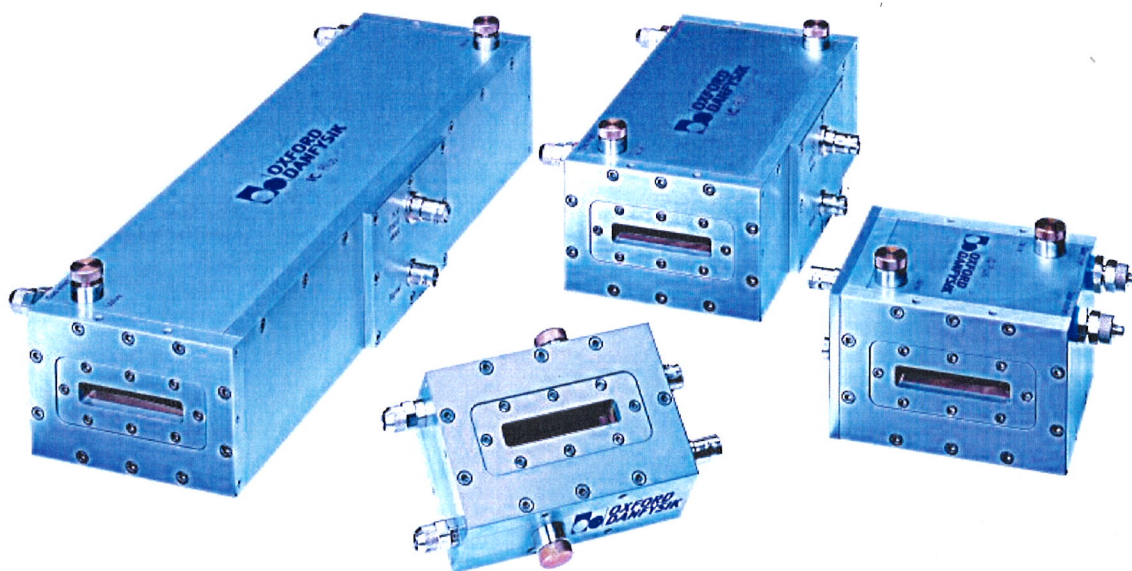




IC Plus Ionization Chamber Operating and Service Manual



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2. General Description

The IC Plus range of ionization chambers offers premium performance at low cost. The range consists of four models :

- IC Plus 10
- IC Plus 50
- IC Plus 150
- IC Plus 300

These differ only in the length of the electrodes (10, 50, 150 or 300 mm). The separation between the electrodes may be changed by the user between three positions : 10, 14 and 18mm. This is the same for all models.

The latest version of the chambers feature special conductive window materials which help to improve the shielding and thus reduce noise. These windows are black, they replace the old yellow Kapton windows which are now no longer supplied.

3. Wiring

Warning:

**LETHAL VOLTAGE PRESENT INSIDE DEVICE
WHEN OPERATED:**

1700 VOLTS MAXIMUM High Voltage supply .

**USER MUST DISCONNECT DEVICE BEFORE
OPENING HOUSING FOR ANY REASON.**

Please note that permanent damage to the chamber can occur if rated High Voltage supply value (above) is exceeded.

Special gas : In case the chamber is filled with special gas, beware of electric flash possibly occurring between upper and lower electrodes for High Voltage supply values LOWER THAN 1700 VOLTS.

Disturbing ground loops : In order to avoid unwanted effects, the body of the chamber should always be electrically *isolated* from the experiment where it is installed.

Shielding ground : In order to obtain the best signal shielding, the body of the chamber must always be electrically *connected* to the ground of the ultra-low current measuring electronics used .

3.1 *Upper electrode (valve side)*

Connected to the high voltage SHV connector – gold plated.

3.2 *Lower electrode*

Connected to the signal BNC connector – gold plated.

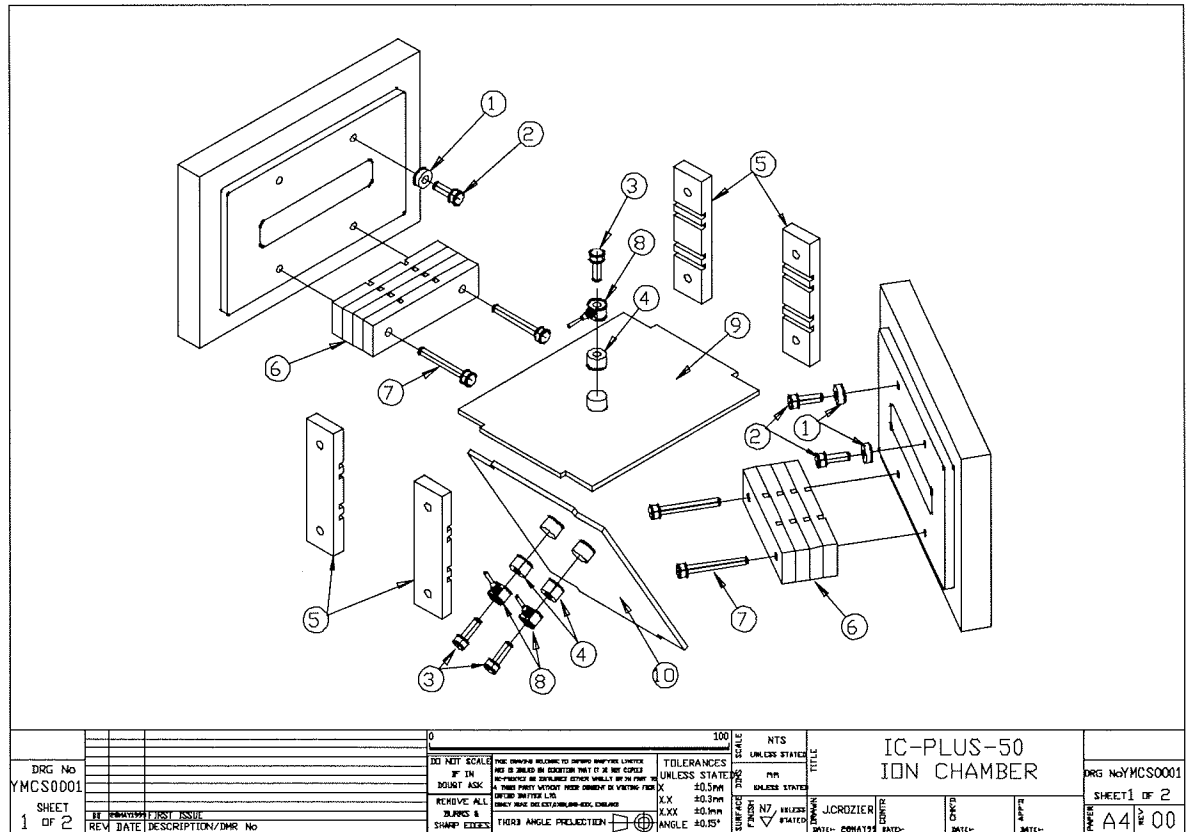
3.3 *Ground*

Connected to the signal guard ring and to the body of the chamber.

4. Electrode Separation

When assembled at the factory, the electrode separation is 10mm.

If a 14 or 18mm distance is needed, use brass washers, teflon spacers and stainless steel screws set on parking positions 1, 2, 6 and 7 (drawing ref YMCS 0001 sheet 1, below) inside the chamber. The following table defines the quantities.



To open the chamber proceed as explained below

1. Unscrew the eight H screws to remove the connectors plate C
2. Unscrew the twenty F screws to remove both end plates B.
3. During operation 1 and 2 watch the 'O' rings.
4. Gently push electrodes out of the body A of the chamber.

To avoid contamination of the chamber wear protection gloves.

OPERATING POSITIONS: 3, 4 & 5

Location as referred on drawing ref YMCS0001 sheet 1							
4 – Brass washer			3 – Stainless steel screw		5 - Teflon spacer		
Distance (mm)	Thickness (mm)	Qty	Dimension (mm)	Qty	Type	Qty	
10	4	3	M 2,5 x 10	3	10 - 18 mm	4	6
14	2	3	M 2,5 x 8	3	14 mm	4	6
18	0	3	M 2,5 x 8	3	10 - 18 mm	4	6
						50	150
						Chamber length (mm)	

OPERATING POSITIONS: 1, 2 & 6

Location as referred on drawing ref YMCS0001 sheet 1							
1 – Brass washer			2 - Stainless steel screw		6 - Teflon spacer		
Distance (mm)	Thickness (mm)	Qty	Dimension (mm)	Qty	Type	Qty	
10	2	3	M 2,5 x 8	3	14 mm	4	6
14	4	3	M 2,5 x 10	3	10 - 18 mm	4	6
18	2 + 4	3 + 3	M 2,5 x 10	3	14 mm	4	6
						50	150
						Chamber length (mm)	

To reassemble the chamber proceed the reverse way, understand that the purpose of playing with brass washers is to always accommodate the fixed connectors spacing when electrodes distance is changed.

5. Ionization Chamber Parts List

Drawing ref : YMCS0001 sheet 2

Ref	Item	Qty
A	Body	1
B	End plate	2
C	Connector plate	1
D	Window sealing plate	2
E	Window material	2
F	Stainless steel M 3 x 12 allen screw	20
G	Stainless steel M2,5 x 6 allen screw	16
H	Stainless steel M 3 x 8 allen screw	8
I	Valve	2
J	Gas fitting	2

Drawing ref : YMCS0001 sheet 1

Ref	Item	Qty
1	2 mm brass spacer	3
2	Stainless steel M 2,5 x 8 allen screw	3
3	Stainless steel M 2,5 x 10 allen screw	3
4	4 mm brass spacer	3
5	10-18 mm teflon spacer	4 (L=50) 6 (L=150) 8 (L=300)
6	14 mm teflon spacer	4 (L=50) 6 (L=150) 8 (L=300)
7	Stainless steel M 2,5 x 20 or 30 allen screw	2

8	Connection	3
9	Upper electrode	1
10	Lower electrode	1

6. How to detect an abnormal current leak on the IC Plus “Signal” path

An abnormal current leak through "Signal" path means that, when set to highest sensitivity, the **IC Plus Electronics** (or other) nano-ampere measurement device used will show a very high current offset with no beam through the ionization chamber, whatever the high voltage polarization value:

to check this, just choose Range 1 (1 nA full scale) on the **IC Plus Electronics** unit connected to the ionization chamber; analog and digital outputs mean values should be equal or lower than:

- 20 mV on "Analog out 0-10V",
- 2 kHz on "Frequency out 0-1MHz",
- 500000 as "Current read-out" value displayed on the "**IC Plus Electronics**" demo software window when "Remote" mode is used (digital value available on serial link is encoded on 28 data bits, so Full Scale value is 262 144 000).

7. IC Plus Readout Electronics

Oxford Danfysik offer two versions of an interface electronics unit. This comprises high voltage power supply, high gain current amplifier, voltage to frequency converter, voltage and frequency output, remote control and current reading via RS232 and digital input / output for control and readback of shutter positions etc.

The two versions include a piggy-back unit which bolts directly to the side of the ion chamber (eliminating cables), and a stand alone unit connected to the chamber with short cables. Please see our website for more details.

8. IC Plus Electronics mounting on IC Plus Ionization Chamber

1. Unscrew the eight H screws to remove the connectors plate of the ionization chamber (caution: watch the O-ring), as shown on the drawing in Section 4.

2. Replace the connector plate by the IC Plus Electronics: gently insert the black connectors on the rear panel of the electronics into the inside pins of the ionization chamber, then screw three H screws on each side of the plate, as shown on drawing ref YMCS 0001 sheet 3, part 2. Store the two remaining screws safely in case you have to remount the connector plate.

9. Warranty

1. OXFORD DANFYSIK warrants that the Equipment shall be free from defects be reason of faulty design, workmanship or materials and that if within the guarantee period set out in sub-clause 3 the Equipment proves defective for such reason OXFORD DANFYSIK shall adjust, repair or replace it as it sees fit free of charge, provided that:

1.1 The Equipment has been used solely for the purpose for which OXFORD DANFYSIK understands it is to be used and in accordance with the operating instructions;

1.2 The defect has not been caused by fire, accident, misuse, neglect, incorrect installation by the customer, its customers, agents or servants or unauthorised repair or maintenance or by use of sub-standard consumables;

1.3 The defect has not arisen from any design, specification, component or material supplied by the customer.

1.4 No part of the Equipment has been replaced with a part not supplied by OXFORD DANFYSIK or approved as suitable by it;

1.5 Payment in full or all sums due in respect of the Equipment has been made;

1.6 The customer shall be liable for any costs incurred by OXFORD DANFYSIK in responding to claims made in respect of erroneous results caused by operator error or incorrect application.

1.7 Upon the customer making a claim under sub-clause 1 it shall accord sufficient access to the Equipment to enable OXFORD DANFYSIK staff to inspect and adjust, repair, remove or replace the Equipment.

1.8 OXFORD DANFYSIK will co-operate with the customer in the assessment of reported defects by the final decision regarding the applicability of this guarantee shall rest with OXFORD DANFYSIK.

2. OXFORD DANFYSIK shall decide if the Equipment should be repaired pursuant to sub-clause 1 at its site or returned.

3. The applicable guarantee period shall be 12 months after delivery save where the Equipment is installed and/or commissioned by or under the supervision of OXFORD DANFYSIK in which case it shall be 12 months from the date of the installation certificate or 18 months after the date of delivery, whichever is the earlier.